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10/549,692

06/23/2006

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EXAMINER

HU, RUI MENG

ART UNIT

PAPER NUMBER

2618

NOTIFICATION DATE

DELIVERY MODE

10/17/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/549,692 | SJOLAND ET AL. | |
| | Examiner | Art Unit | |
| | RuiMeng Hu | 2618 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-13,15 and 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-13,15 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 06/23/2008 have been fully considered but they are not persuasive.

Regarding **claim 1**, Applicant argues **Aoyama et al.** fail to disclose “a passive mixer” including “a feedback circuit operatively connected to said third and said second terminal”.

The Examiner respectfully submits that Aoyama et al. disclose a passive mixer 48 (figure 4, column 9 lines 19-31 and column 16 lines 12-25 show that the mixer 48 is a passive device, the PLL circuit can be constituted by only the passive devices) for converting a first signal having a first frequency (figure 4, RF signal) to a second signal having a second frequency (figure 4, IF signal), comprising: mixing means (mixer 48), a first terminal (RF terminal), a second terminal (LO terminal) and a third terminal (IF terminal), for providing the second signal (IF signal) by mixing a third signal (LO signal) having a third frequency (LO signal) provided as input at said second terminal (LO terminal) and the first signal (RF signal) provided as input at either the first or the third terminal; and a feedback circuit (figure 4, the feedback circuit comprises LPF 49, VCO 43, Pre-Scaler 44 and Distributor 45; and the PLL circuit comprises the feedback circuit and mixer 48; the feedback circuit is not considered a feed-forward circuit, since it is with respect to the output of mixer 48 but not the output of VCO; and the feedback circuit is part of the mixer since the feedback circuit generates LO signal) operatively

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connected to said third terminal (IF terminal) and said second terminal (LO terminal), wherein the feedback circuit comprises a low pass filter (LPF 49).

Still regarding **claim 1**, Applicant argues **Hoover** fails to disclose “a passive mixer” including “a feedback circuit operatively connected to said third and said second terminal, wherein the feedback circuit comprises a low pass filter”.

The Examiner respectfully submits that Hoover discloses in claims 15 and 16, and figure 1, low-pass filtering network means (resistors 70, 72, capacitors 32, 51) having an input connection to which said output terminal 50 connects and having first and second output connections 49, 28, for providing first and second direct bias potentials each equal to the quiescent potential at said output terminal 50; wherein said low pass filtering network means includes first and second resistances 70, 72 respectively connecting said output terminal 50 to a point of connection 49 and to an interconnection 44, a first capacitor 51 connected for by-passing said point of interconnection 44 for signal, and wherein means for additively combining said input signal ($E_{in1} = f_1$) with said first direct bias potential includes a coil 36 connecting said point of connection 49 to an interconnection 44 (It is clear that the electric current flows from terminal 50 through resistor 72 to provide a bias potential signal, and the bias potential signal is combined with input signal $E_{in1} = f_1$, thus the low pass filtering network (resistor 72 and capacitor 51) is considered a feedback circuit). Hoover further discloses the mixer is made with field effect transistors (FETs), such as those of the metal-oxide-semiconductor (MOS) type (column 1 lines 10-11), and the FETs all quiescently conduct to operate in their linear region (column 2 lines 25-48), it is clear

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that the FETs provide no signal gains during mixing, thus the mixer is considered a passive mixer.

Response to Amendment

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1 and 16** are rejected under 35 U.S.C. 102(b) as being anticipated by **Aoyama et al. (US Patent 5517685)**.

Consider **claim 1**, Aoyama et al. disclose a passive mixer 48 (figure 4, column 9 lines 19-31 and column 16 lines 12-25 show that the mixer 48 is a passive device, the PLL circuit can be constituted by only the passive devices) for converting a first signal having a first frequency (figure 4, RF signal) to a second signal having a second frequency (figure 4, IF signal), comprising: mixing means (mixer 48), a first terminal (RF terminal), a second terminal (LO terminal) and a third terminal (IF terminal), for providing the second signal (IF signal) by mixing a third signal (LO signal) having a third frequency (LO signal) provided as input at said second terminal (LO terminal) and the first signal (RF signal) provided as input at either the first or the third terminal; and a feedback circuit (figure 4, the feedback circuit comprises LPF 49, VCO 43, Pre-Scaler 44 and Distributor 45; it is considered a feedback circuit but not feed-forward circuit, as with respect to mixer 48) operatively connected to said third terminal (IF terminal) and

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said second terminal (LO terminal), wherein the feedback circuit comprises a low pass filter (LPF 49).

Consider **claim 16 as applied to claim 1**, Aoyama et al. disclose wherein: said first signal (figure 4, RF signal) is provided as input at said first terminal; said second signal (figure 4, IF signal) is supplied as output at said third terminal; said first frequency is a radio frequency (figure 4, RF signal); and said second frequency is an intermediate frequency (figure 4, IF signal).

4. **Claims 1, 2, 5-7, 9 and 16** are rejected under 35 U.S.C. 102(b) as being anticipated by **Hoover (US Patent 4090139)**.

Consider **claim 1**, Hoover discloses a passive mixer (FET mixer circuits, column 1 line 43-column 3 line 28) for converting a first signal having a first frequency (figure 1, E_IN2 which may be at a modulating frequency f_2 is applied to the primary winding 14 of a transformer 16) to a second signal having a second frequency (The parallel resonant circuit 66 is tuned to one of the side-band frequencies $f_2 + f_1$ or $f_2 - f_1$ and an output signal at this frequency is available at the terminals of winding 68 which is coupled to coil 62), comprising: mixing means (the first and second COS/MOS pairs), a first terminal, a second terminal and a third terminal (figure 1), for providing the second signal by mixing a third signal (figure 1, E_IN1 which may be at a carrier frequency f_1) having a third frequency provided as input at said second terminal and the first signal (the modulating signal) provided as input at either the first or the third terminal; and a feedback circuit (figure 1, feedback circuit comprising capacitor 51 and resistor 72) operatively connected to said third and said second terminal (figure 1, E_OUT terminal

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and E_IN1 terminal), wherein the feedback circuit comprises a low pass filter (claim 15, figure 1, the low pass filter comprising capacitor 51 and resistor 72).

Consider **claim 2 as applied to claim 1**, Hoover discloses wherein the feedback circuit is a bootstrap circuit (figure 1, the low pass filter comprising capacitor 69 and resistor 72).

Consider **claim 5 as applied to claim 1**, Hoover discloses wherein said mixing means is a voltage controlled switch (the FET mixer circuit has voltage controlled switch characteristics).

Consider **claim 6 as applied to claim 1**, Hoover discloses wherein said mixing means comprises a FET transistor switch (figure 1, FET mixer) having either its drain or source operatively connected to said first terminal (figure 1), its gate operatively connected to said second terminal (figure 1, carrier signal port connected to the gates of the first COS/MOS pair), and either its source or drain operatively connected to said third terminal (figure 1, E_OUT terminal).

Consider **claim 7 as applied to claim 6**, Hoover discloses characterized in that said FET transistor is an NMOS transistor (figure 1, N1, NMOS transistor).

Consider **claim 9 as applied to claim 1**, Hoover discloses wherein the mixer is included in electronic equipment (the disclosed FET mixer circuits used for converting a frequency signal together with a common-gate amplifier, such mixer can be used in a variety of electronic equipments).

Consider **claim 16 as applied to claim 1**, Hoover discloses wherein: said first signal (figure 1, $E_{in2} = f_2$) is provided as input at said first terminal; said second

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signal (figure 1, E_out) is supplied as output at said third terminal; said first frequency is a radio frequency (figure 1, E_in2 = f_2); and said second frequency is an intermediate frequency (figure 1, E_out).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. **Claims 4 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hoover (US Patent 4090139)** in view of **Geddes et al. (US Patent 5263198)**.

Consider **claim 4 as applied to claim 1, claim 15 as applied to claim 1**, Hoover discloses wherein the low pass filter comprises a capacitor connected between said second terminal and said mixing means (the teaching of a low pass filter comprises a capacitor as to filter a LO signal is well known in the art, see Geddes et al. (US Patent 5263198) figure 2 capacitor 80, therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection techniques into the art of Hoover as to include a capacitor to block DC signals), and a resistor (Hoover, resistor 72) connected between said third terminal and the connection between said capacitor and said mixing means (the capacitor 80 filters the carrier signal before the carrier signal being inputted to the mixing means, see figure 2 of Geddes et al).

9. **Claims 8, 10-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hoover (US Patent 4090139)**.

Consider **claim 8 as applied to claim 1**, Hoover fails to disclose wherein the mixer is a balanced mixer comprising an even number of mixing means.

However, the teaching of double balanced mixer is well known in the art.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection techniques into the art of

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Hoover as to modify the mixer circuit in figure 1 into a double balanced mixer as a second embodiment.

Consider **claim 10 as applied to claim 9**, Hoover fails to disclose wherein the electronic equipment is a portable communication equipment having a supply voltage of less than 2V.

However, the teaching of a portable communication device utilizing a mixer is well known in the art, and according to the reference specification, the mixer is capable of operating in a portable communication device having a supply voltage of less than 2V.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection techniques into the art of Hoover as to utilize the mixer circuit in a portable communication device having a supply voltage of less than 2V.

Consider **claim 11 as applied to claim 9**, Hoover fails to disclose wherein the electronic equipment is a mobile radio terminal, a mobile telephone, a pager, or a communicator.

However, the teaching of a mobile communication device utilizing a mixer is well known in the art, and according to the reference specification, the mixer is capable of operating in a mobile communication device.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection techniques into the art of Hoover as to utilize the mixer circuit in a mobile communication device.

Consider **claim 12 as applied to claim 9**, Hoover fails to disclose wherein the electronic equipment is adapted to operate in a wireless local area network.

However, the teaching of a wireless mobile communication device utilizing a mixer is well known in the art, and according to the reference specification, the mixer is capable of operating in a wireless mobile communication device.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection techniques into the art of Hoover as to utilize the mixer circuit in a wireless mobile communication device.

Consider **claim 13 as applied to claim 9**, Hoover fails to disclose wherein the electronic equipment is communication equipment adapted to provide short-range supplementary communication according to Bluetooth.RTM. technology.

However, the teaching of a Bluetooth device utilizing a mixer is well known in the art, and according to the reference specification, the mixer is capable of operating in such device.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection techniques into the art of Hoover as to utilize the mixer circuit in a Bluetooth device.

Conclusion

Any response to this Office Action should be **faxed to (571) 273-8300 or mailed**

to: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RuiMeng Hu whose telephone number is 571-270-1105. The examiner can normally be reached on Monday - Thursday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on 571-272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/RuiMeng Hu/
R.H./rh
October 2, 2008

/Edward Urban/

Supervisory Patent Examiner, Art Unit 2618